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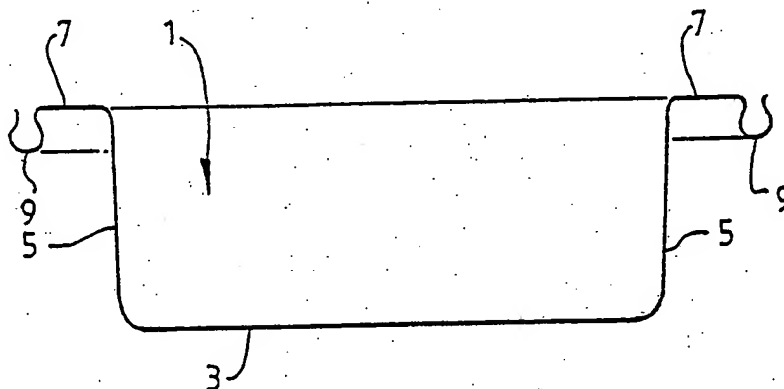
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<p>(21) International Application Number: PCT/AU89/00394</p> <p>(22) International Filing Date: 13 September 1989 (13.09.89)</p> <p>(30) Priority data: PJ 0477 16 September 1988 (16.09.88) AU</p> <p>(71) Applicant (for all designated States except US): GARWOOD LIMITED [AU/AU]; 557 Burwood Highway, Knoxfield, VIC 3180 (AU).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): GARWOOD, Anthony, James, Murray [AU/AU]; 557 Burwood Highway, Knoxfield, VIC 3180 (AU).</p> <p>(74) Agent: BRETT, Noel, T.; Griffith Hack &amp; Co., 601 St Kilda Road, Melbourne, VIC 3004 (AU).</p>	<p>(81) Designated States: AT (European patent), AU, BE (European patent), BR, CH (European patent), DE (European patent), DK, FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), US.</p> <p>Published With international search report.</p>	

(54) Title: IMPROVED PACKAGING

(57) Abstract

A method and apparatus for producing base members (1) is provided. The method involves moving plastics material between male and female die members (D1) and (D2) after bringing the plastics material to a thermoforming temperature. The material is then caused to conform to the shape of die member (D1) by applying pressure from a gas suction through passageways (15). The material is then caused to conform to the shape of die member (D2) by applying a gas suction through passageways (15). The base (1) is initially shaped by die member (D1) and then finally shaped by die member (D2). The depth of die member (D1) is less than that of die member (D2). The method and apparatus enables the bases (1) to have a substantially uniform thickness relative to a base (1) made by forming over a single die member to a final shape and size. The method and apparatus also enables the production of a peripheral roll lip (9) to bases (1) so that when nested together lips (7) will be separated by the diameter of the peripheral roll lip (9) and hence be easier to separate from the nested relationship.



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IMPROVED PACKAGING

5 Field of the Invention

This invention relates to producing packaging bases and to producing roll lips on plastics articles and relates particularly but not exclusively to producing roll lips on plastics material bases for use in packaging foodstuffs.

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Description of Prior Art

Hitherto in the art of packaging foodstuffs such as fresh meats, vegetables, dairy produce and the like, it has been known to provide a plastics material base as of P.V.C., on which the goods are placed. A flexible plastics material is then wrapped over the goods on the base to enclose the goods relative to the base.

Conventionally plastics material bases are formed by either male or female die members by passing a sheet of the plastics material between heat banks or in proximity to heat banks so that the material is heated to a thermo-forming temperature and then causing the heated material to be brought into contact with a male or female die member by drawing or blowing the material onto a male or female die member to form the base. A significant problem which occurs with this type of method is that the base is thinner in some parts than in other parts. For example, if a female die member is used into which the material is blown to cause the material to conform to the shape of the die member to form the base, since the material is effectively stretched when it is forced into the die member the peripheral edges of the base remain generally of the same thickness as the sheet material but the portion of the base which is forced into the die member is of reduced thickness due to the material being stretched to conform to the shape of the die member. If a male die member is used and the material is forced over the male die member to conform to its shape, the bottom part of the base member has generally the same thickness as the material sheet but the side walls and peripheral edge have a reduced thickness in view of the fact that the material is stretched over the corresponding parts of the die.

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The plastics material bases which have been formed are usually stacked one on top of the other in nested relationship. Because the bases have an upper peripheral flange it makes separation of the nested bases extremely difficult as the flanges lie on top of each other in direct contact with each other. It is not possible to easily separate the flanges and hence the bases. In addition, the bases are usually formed by a thermo-forming process from a continuous sheet of plastics P.V.C. material. The bases are then separated from the plastics material sheet as by punching or otherwise cutting around the outer edge of the peripheral flange or lip on the bases. The cutting produces a sharp and/or jagged edge which, in turn, can cause cutting of persons' fingers. The sharp or jagged edge makes separation of nested bases by mechanical means extremely difficult.

Accordingly it has been proposed that a roll lip be provided on the bases whereby it will space the upper flanges of the bases in spaced apart relation when the bases are nested together. In addition by providing a roll lip of a certain configuration it is possible to have any edge of the base displaced inwardly relative to the outermost surface of the roll lip. Thus any sharp edges which may be produced will be less likely to cause a problem than in the prior art.

#### Objects and Statement of Invention

An object of a first aspect of this invention is to provide a method for forming a base which overcomes these problems.

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The invention, in a first aspect, may be said to reside in a method of forming a packaging base member using both a female die member and a male die member comprising the steps of;

5 bringing a plastics material to a thermo-forming temperature,

causing the heated plastics material to conform to the shape of one of a male or female die member for partly forming the base member,

10 causing the partly formed base member to conform to the shape of the other of the male or female die member to finally form the base member;

wherein a forming surface of the male or female die member which forms the partially formed base is of  
15 lesser depth than the forming surface of the other of the male or female die member which forms the base member.

The invention in its first aspect may also be said to reside in apparatus for forming a packaging base, said apparatus comprising heating means for heating a  
20 plastics material to a thermo-forming temperature, a first die member of male or female configuration having a forming surface for forming said material into a partially formed base, a second die member of the other of the female or male configuration having a forming  
25 surface for forming the partially formed base into the packaging base member, the said forming surface of the male or female die which forms the partially formed base being of lesser depth than the forming surface of the male or female die member which forms the base from the  
30 partially formed base.

Since the base is partially formed on one of the die members, for example, a male die member, the plastics material is of reduced thickness on side walls and peripheral edge of the base but of the same thickness

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as the plastic sheet on the bottom of the base and since the base is then finally formed by the, for example, female die member, the bottom part of the base is reduced in thickness in this forming step whilst generally  
5 maintaining the same thickness of the side wall and peripheral edge portion to thereby result in a base which has a substantially constant thickness throughout. This therefore more evenly spreads the material over the entire base and therefore results in a base which does  
10 not have generally thick portions and very thin portions but rather a base which is of intermediate uniform thickness. The intermediate uniform thickness overcomes problems which may occur with bases which have very thin portions and therefore provides a packaging base of  
15 better quality and of more robust nature.

The present invention also proposes a method of producing plastics material members with roll lips. The invention also envisages apparatus for producing a plastics material member with a roll lip.

20 Therefore in accordance with a further broad aspect of the present invention there may be provided a method of forming a plastics material member with a roll peripheral lip comprising:

- 25 (A) Heating plastics material to a thermo-forming temperature;
- (B) Clamping the plastics material;
- (C) Applying a gas pressure to a peripheral zone of said plastics material where the roll peripheral lip is to be formed, to  
30 (D) cause the plastics material in said zone to be shaped into a roll and

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(E) subsequently severing said roll to form a free edge of said plastics material member at a side of said roll opposite to where said roll extends from said plastics material member.

5 Most preferably the roll is produced in a movable die member which has severing means formed thereon. Thus, the movable die member will have a cavity which defines a part at least of the roll lip, and it will have a severing means as well. Thus, the plastics  
10 material can be formed into the roll in the cavity whereupon the movable die can then be moved to permit the severing to occur.

Most preferably the clamping is effected between a heating member and the movable die member.

15 A plastics material member produced by the method outlined above is also within the scope of the present invention. Apparatus for performing the method and for producing a plastics material member of this type is also included within the scope of the invention.

## 20 Brief Description of the Drawings

In order that the invention can be more clearly ascertained preferred embodiments will now be described with reference to the accompanying drawings wherein:-

Figure 1 is a vertical cross-sectional view  
25 taken through a preferred plastics material base of the present invention and proposed to be used in the packaging industry;

Figure 2 is a vertical cross-sectional view taken through preferred apparatus of the present  
30 invention used for producing a base and a roll lip of a type shown on the edge of the packaging base shown in Figure 1;



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Figure 2A is a detailed view of the circled part of Figure 2;

Figure 3 is a view showing a second embodiment of the roll lip forming method and apparatus; and

5        Figure 4 is a view showing a third embodiment of the roll lip forming method.

#### Detailed Description of Preferred Embodiments

Referring firstly to Figure 1 there is shown a plastics material base as of P.V.C. of approximately 400  
10        micron thickness. Typically the plastics material is transparent so that goods such as fresh meats, vegetables and the like which are eventually placed within the base 1 can be viewed easily by an intended purchaser. The base 1 is of rectangular configuration with a bottom 3, side walls 5 and an upper peripheral lip or flange 7. A roll peripheral lip 9 is produced in a peripheral zone of the peripheral lip or flange 7. Prior art bases 1 did not include a roll peripheral lip 9 but terminated at the outer edge of the peripheral lip or flange 7. The  
15        arrangement of the roll peripheral lip 9 is such that when the bases 1 are nested together, the peripheral lip or flanges 7 will be spaced apart by a distance generally equal to the external diameter of the roll peripheral lip 9.

25        The roll peripheral lip 9 may be upwardly extending rather than downwardly extending as shown in Figure 1.

With reference to Figure 2 one or more heat banks 11 are provided for heating the plastics material P  
30        from which the bases 1 are made. The heat banks 11 heat the plastics material to a thermo-forming temperature and the bases 1 are formed by a pair of dies D1 and D2. The dies D1 and D2 are provided with die members A, B and C

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- which are more fully shown in Figure 2A. The die member D1 is a male die member and the plastic sheet P is caused to conform to the forming surface of the die D1 to form a partially formed base which has a bottom 3, side walls 5 and a lip or flange 7. The plastic sheet P can be brought into contact with the die D1 by moving the die D1 relative to the die D2 and by applying air suction through air passages 15 in the die D1 to cause the plastic sheet P to conform to the shape of the die D1.
- 10 When the plastic sheet P conforms to the shape of the die D1 the plastic sheet is stretched in the vicinity of the walls 5 and flange 7 and this reduces the thickness of the plastic sheet at those areas of the partially formed base. In order to completely form the base 1 the partially formed base 1 is caused to conform to the forming surface shape of the die D2 by reversing the air flow through the passages 15 so that the partially formed base 15 is blown into the die D2 and/or by suction applied to the passages 15 in the die D2. This causes
- 20 the bottom 3 of the base 1 to be forced down into the die D2 which stretches the bottom 3 to thereby fully form the base 1. Since both a male and a female forming process takes place to form the base 1, the base has a generally uniform thickness of intermediate thickness between the generally thick parts of a base and thin parts of a base which are otherwise formed by conventional base forming methods. Therefore, the plastics material which forms the base 1 is generally uniformly spread throughout the base 1 and a more robust base is provided.
- 25
- 30 It will be noted in Figure 2 that the depth X of the forming surface of the die D1 is less than the depth Y of the forming surface of the die D2. The die which forms the partially formed base is thinner than the die which forms the fully formed base, i.e. has a forming

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depth less than that of die D2, so that stretching in the vicinity of the lip or flange 7 and wall 5 takes place over the male die D1, and stretching of the bottom 3 takes place in the female die D2 to result in a base 1 which has a generally uniform thickness.

If desired, the dies D1 and D2 could be reversed and the female die D2 could be used to form the partially formed base and be of smaller forming surface depth than the die D1 which fully forms the base.

10 Figure 2A shows a detailed view of the circled part of Figure 2 which forms the peripheral lip 9. The die part B can be integral with the die D2 or could be arranged for location beside the die D2 and for movement relative to the die D2. It will be noted that the dies B  
15 and C define a concave cavity 17 and that the die C has a severing means 19. The die member A is in the form of a plug which is movable relative to the die member D1 and the die members B and C. In order to form the base 1 and the peripheral lip 9 the plastics material P is clamped  
20 in a pair of clamping members 14 which are provided downstream of a heat bolster 16. In order to form the lip 9, the die member A is moved downwardly relative to the die D1 and suction is applied to air passages 18 which causes the plastics material P to generally conform  
25 to the shape of the die member A. The die members C and/or B are then moved upwardly relative to the die member A so that the severing means 19 holds the plastics material P against the heat bolster 16. Air may then be blown through the air passages 18 to cause the plastics  
30 material P to move outwardly of the die A and to conform to the concave shape 17 defined by the die members B and C. The die member C may then be moved upwardly so that the severing means 19 severs the plastics material P at the edge of the formed peripheral lip 9.

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The peripheral lip 9 may be formed by movement of the die members A, B and C generally at the same time as the base 1 is formed by the die members D1 and D2 or may be formed subsequently to the formation of the base 1. The die members A, B and C may also be reversed depending on whether the lip 9 is to be formed in the upward direction or downward direction.

The die members B and C are preferably cooler, in the vicinity of cavity 17, than the die member A to enable the plastics material to solidify when it contacts the die member B and C to thereby maintain the shape of the peripheral lip 9.

The forming of the roll lip 9 can be considered to employ the teachings of the inventive concept relating to the forming of the base 1 whereby a generally uniform thickness will be provided to the plastics material in the roll lip 9.

Referring now to Figure 3 there is shown a close up vertical cross-sectional view at one side of a second embodiment of the apparatus used for producing the roll peripheral lip 9 in the base 1. The apparatus has a heat bank 11 which is used for heating the P.V.C material or other suitable plastics material from which the bases 1 are made, to a thermo-forming temperature. The apparatus has three movable die members shown respectively as A, B and C in Figure 3. During the forming procedure of the roll peripheral lip 9 the movable die member A is first elevated so that the plastics material is clamped at the upper surface 13 of movable die member A and the undersurface of the heat bank 11. Movable die member B is then elevated to a point where the plastics material is held but not necessarily clamped adjacent to the undersurface of the heat bank 11. Air and/or gas is then allowed to pass

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through passageway means 15 in the heat bank 11 to cause the plastics material in a peripheral zone of the peripheral lip or flange 7 to move downwardly into the concave cavity 17 in the movable die member A.

5           Movable die member C can then be elevated so that an upper surface - severing means 19 - engages with the undersurface of the plastics material and slightly compresses it relative to the heat bank 11. Air and/or gas is continued to be passed through the passageway  
10 means 15. An increasing air and/or gas pressure may be required at this time. The zone of the peripheral lip or flange 7 is then caused to conform to the shape of a concave cavity 21 of the movable die member C. In order to assist the plastics material conforming to the shape  
15 of the concave cavity 21, passageway means 23 may be provided in the movable die member C and through which air and/or gas can be exhausted. The exhausting of gas in this manner will in effect provide a low pressure gas region between the surface of the plastics material and  
20 the surface of the concave cavity thus assisting the forming of the plastics material into the roll peripheral lip 9. When the roll peripheral lip 9 has been formed, the movable die member C can then be raised further whereby to sever said roll to form a free edge 25 in the  
25 plastics material at a side of the roll peripheral lip 9 opposite to where said roll peripheral lip 9 extends from the plastics material of the peripheral lip or flange 7.

At this point of time the movable die member B may be elevated to slightly compress the material in the  
30 peripheral lip or flange 7 causing it to displace slightly sideways and to perhaps close the upper most portion 27 of the roll peripheral lip 9. The plastics material will be at a thermo-forming temperature by

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virtue of its contact with the heat bank 11 and thus there may be partial melting of the plastics material to effect bonding when the uppermost portion 27 closes.

When the severing means 19 of the movable die member C effects severing the resultant cut is unlikely to have a sharp or jagged edge because the heat bank 11 will have the plastics material at a temperature where it will be slightly molten. Thus, the extreme sharp edge will round.

10 It can be said that the apparatus disclosed in Figure 3 will provide for a roll peripheral lip 9 to be produced on a plastics material member.

To extract the plastics material member - base 1 - from the apparatus requires that at least the movable 15 die members A, B and C be displaced. Movable die member C can be displaced downwardly relative to die member B and because of the flexible nature of the roll peripheral lip 9 will easily pass by slight flexible radially inward displacement thereof. Similarly, movable die member B 20 can be lowered causing the roll peripheral lip 9 to then flexibly displace radially outwardly.

Figure 4 shows a variation of the apparatus shown in Figures 2 and 3 where the movable die member C now has a cavity to completely shape the roll peripheral 25 lip 9. The arrangement does not require the use of a movable die member A as the initial clamping is affected by the free edge 25 of the movable die member C on the undersurface of the heat bank 11.

The movable die members A, B and C can be 30 suitably temperature controlled to be at temperatures lower than that of the heat bank.

The roll peripheral lip 9 is such that, if required, a snap lid (not shown) can be caused to snap engage with the roll peripheral lip 9 to close or contain

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any goods in the base 1. The roll peripheral lip 9, because of its hollow and flexible nature is such that a good seal can be made with the lid.

Modifications may be made to the present  
5 invention as would be apparent to persons skilled in the plastics material forming arts. These and other modifications are deemed to be within the scope of the invention, the nature of which is to be determined from the foregoing description.

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## CLAIMS:

1. A method of forming a packaging base member using both a female die member and a male die member comprising the steps of;

bringing a plastics material to a thermo-forming temperature,

causing the heated plastics material to conform to the shape of one of a male or female die member for partly forming the base member,

causing the partly formed base member to conform to the shape of the other of the male or female die member to finally form the base member;

wherein a forming surface of the male or female die member which forms the partially formed base is of lesser depth than the forming surface of the other of the male or female die member which forms the base member.

2. A method as claimed in Claim 1 wherein the heated plastics material is caused to conform to the shape of one of a male or female die member for partly forming the base member by applying a suction between the heated plastics material and the one of a male or female die member whereby the heated plastics material will be drawn onto the surface thereof.

3. A method as claimed in Claim 2 wherein the partly formed base member is caused to conform to the shape of the other of the male or female die member by applying a suction between the partly formed base member and the other of the male or female die member whereby the heated plastics material will be drawn onto the surface thereof.



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4. A method as claimed in Claim 3 wherein the male and female die members are brought together to clamp the heated plastics material therebetween so that it will be held clamped during the part forming, and the final forming of said base member.

5. A method of forming a plastics material member with a roll peripheral lip comprising:

- (A) heating plastics material to a thermo-forming temperature;
- (B) clamping the heated plastics material in the region where the roll peripheral lip is to be formed;
- (C) applying a pressure to a peripheral zone of said plastics material where the roll peripheral lip is to be formed,
- (D) causing the plastics material in said zone to be shaped into a roll by said pressure; and
- (E) subsequently severing said roll to form a free edge of said plastics material member at a side of said roll opposite to where said roll extends from said plastics material member.

6. A method as claimed in Claim 5 wherein the pressure is initially applied by a gas which will inflate said peripheral zone into a cavity to partly shape said roll peripheral lip.

7. A method as claimed in Claim 6 wherein the pressure is subsequently applied by a gas suction to draw said zone into a cavity.

8. A method as claimed in Claim 7 wherein said peripheral lip is severed by applying force thereto between a severing means, a heat bank heated to a

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thermoforming temperature so that the severed edge will be smooth by virtue of the heat imparted by the thermoforming means.

9. A method as claimed in Claim 5 wherein the pressure is initially applied by a gas suction to draw said peripheral zone over a bolster to partly form the roll.

10. A method as claimed in Claim 9 wherein the pressure is subsequently applied by a gas suction to draw the partly formed roll from the bolster and into a cavity.

11. A method as claimed in Claim 10 wherein said peripheral lip is severed by applying force thereto between a severing means, a heat bank heated to a thermoforming temperature so that the severed edge will be smooth by virtue of the heat imparted by the thermoforming means.

12. Apparatus for forming a packaging base, said apparatus comprising heating means for heating a plastics material to a thermo-forming temperature, a first die member of male or female configuration having a forming surface for forming said material into a partially formed base, a second die member of the other of the female or male configuration having a forming surface for forming the partially formed base into the packaging base member, the said forming surface of the male or female die which forms the partially formed base being of lesser depth than the forming surface of the male or female die member which finally forms the base from the partially formed base.

13. Apparatus as claimed in Claim 12 wherein said first die member has gas suction means so that said plastics material can be shaped to the surface thereof by

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applying a suction thereto to draw said plastics material towards the die surface thereof to form said partly formed base.

14. Apparatus as claimed in Claim 13 wherein said second die member has gas suction means so that said partly formed base can be caused to conform to the shape thereof by applying a suction thereto to draw said partly formed base from said first die member and towards the die surface of the second die member to finally form said base.

15. Apparatus as claimed in Claim 14 wherein said first die member and said second die member can be moved together to clampingly hold said plastics material during the forming of said base.

16. Apparatus as claimed in Claim 12 wherein said first die member and said second die member are shaped to produce a peripheral roll lip around said base.

17. Apparatus as claimed in Claim 16 wherein said second die member has two parts which are moveable relative to each other to form said peripheral roll lip, the peripherally outermost part having severing means which can be moved independently of the first part to sever the outermost portion of said peripheral roll lip from that portion of said plastics material which is outermost of said base.

18. Apparatus as claimed in Claim 17 wherein there is provided a heated part of said apparatus against which said severing means can apply a force to sever said peripheral roll lip and simultaneously moltingly heat said plastics material where severing occurs so that the severed edge of said plastics material will not have a sharp edge.

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19. Apparatus as claimed in Claim 15 wherein said first die member has bolster means which can protrude therefrom and over which said plastics material can be shaped by application of said suction.

20. Apparatus as claimed in Claim 15 wherein said second die member has three parts which are moveable relative to each other to form said peripheral roll lip, there being a peripheral innermost part, a peripherally intermediate part, and a peripherally outermost part, said peripherally innermost part and said peripherally outermost part having cavity surfaces, and said first die member having gas passage means from which gas can be expelled to force said plastics material into said cavity surface to partly form said roll lip, and wherein said intermediate part has cavity surfaces defining a final shape for said roll lip which when said intermediate part is moved into the cavity defined by the cavity surfaces of said innermost part and said outermost part will cause said peripheral roll lip to be formed to the final shape.

21. Apparatus as claimed in Claim 20 wherein said intermediate part has severing means to sever the peripherally outermost part of said peripheral roll lip from said plastics material.

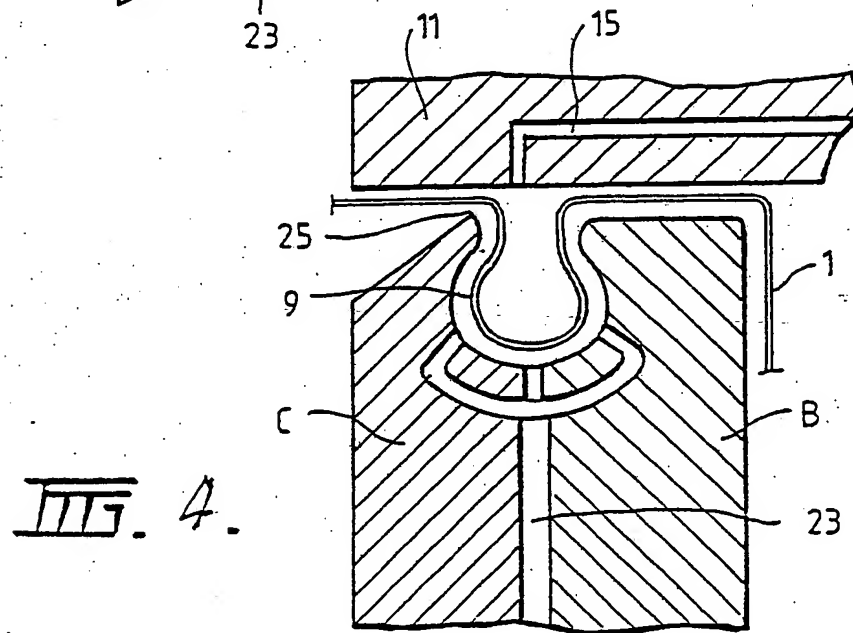
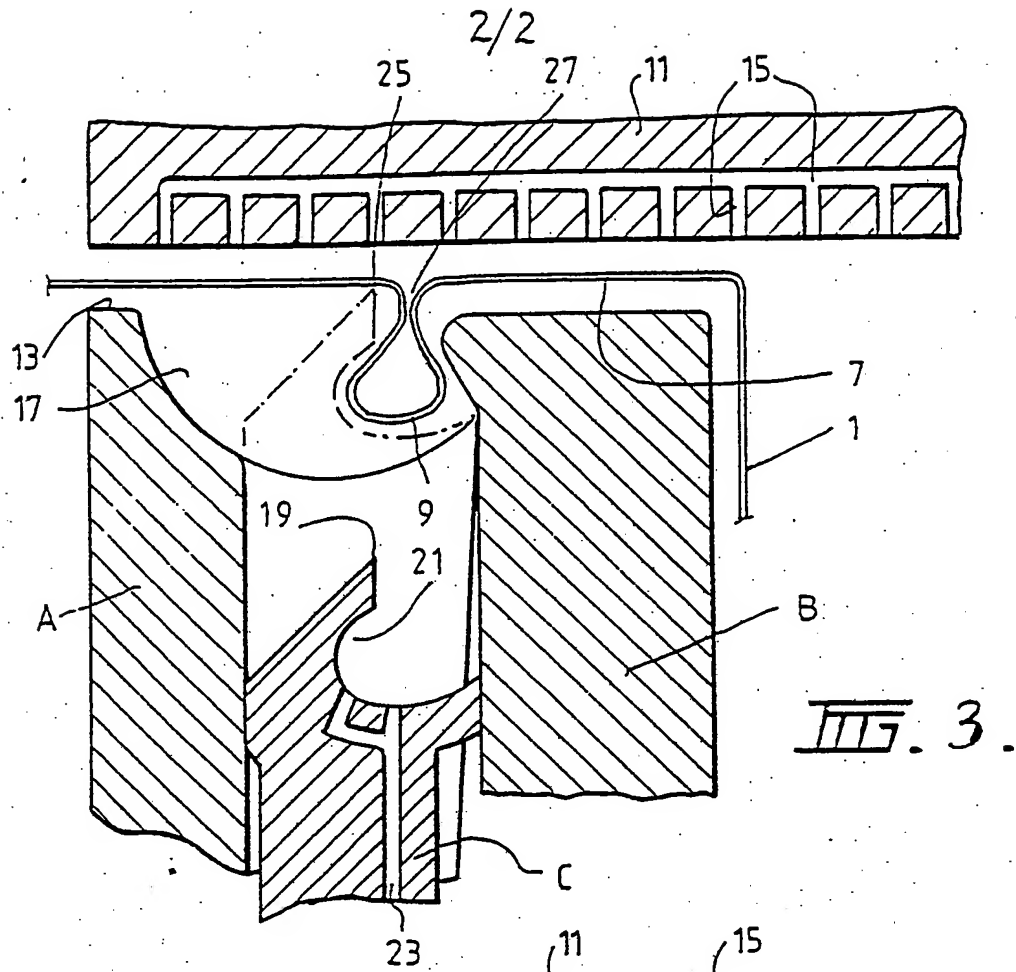
22. Apparatus as claimed in Claim 20, wherein said intermediate part has gas suction means through which suction can be applied to draw the plastics material towards said cavity surfaces therein.

23. Apparatus as claimed in Claim 20 wherein said innermost part can be moved towards said first die member following movement of said intermediate part into the cavity defined by the innermost part and the outermost part, to compress the plastics material between the innermost part and the first die member to cause the plastics material to close the peripheral roll lip.

24. A plastics material base produced by the method of Claim 1.

25. A plastics material member produced by the method of Claim 5.





# INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 89/00394

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) 6		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. <sup>4</sup> B29C 51/10, 51/20		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC	B29C 17/04, 51/10, 51/20	
Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in the Fields Searched 8		
AU: IPC as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 9		
Category*	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X, Y	Patents Abstracts of Japan, M-171, page 166, JP.A, 57.131528 (DENKI KAGAKU KOGYO K.K) 14 August 1982 (14.08.82)	(1-25)
X, Y	AU.B, 41736/64 (288477) (THE DOW CHEMICAL CO) 9 September 1965 (09.09.65)	(1-25)
X, Y	US.A, 3928523 (WARD et al) 23 December 1975 (23.12.75)	(1-25)
X, Y	US.A, 3737498 (JACKSON) 4 May 1971 (04.05.71)	(1-25)
X	Patent Abstracts of Japan, M-290, page 100, JP.A, 59-1211 (MITSUBISHI JUSHI K.K) 6 January 1984 (06.01.84)	(1, 12, 24)
Continued		
<p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"G" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
27 November 1989 (27.11.89)	8 December 1989	
International Searching Authority	Signature of Authorized Officer	
Australian Patent Office	M. BREMERS	



## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	Patent Abstracts of Japan, M-325, page 16, JP,A, 59-89114 (FURAMATSUKU K.K) 23 May 1984 (23.05.84)	(1, 12, 24)
X	AU,B, 53469/73 (468452) (SHELL INTERNATIONALE RESEARCH MAATSCHAPPLJ B.V) 19 September 1974 (19.09.74)	(1, 12, 24)
X	AU,B, 46700/64 (283827) (ILLINOIS TOOL WORKS INC) 13 January 1966 (13.01.66)	(1, 12, 24)
X	AU,B, 36429/71 (474494) (SHELL INTERNATIONALE RESEARCH MAATSCHAPPLJ N.V) 7 June 1973 (07.06.73)	(1, 12, 24)
X	US,A, 3600753 (OTTO) 24 August 1971 (24.08.71)	(1, 12, 24)

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim numbers .... because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers .... because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers .... because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):

VI. ☒ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

Claims 1 and 12 define a method/apparatus for forming a packaging base member. Claim 5 defines a method for forming a roll peripheral lip. There is no single general inventive concept common to claims 5 and claims 1 and 12.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☒ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 89/00394

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Members	
US	3737498	US	3577593
AU	53469/73	CA	1006311
		FR	2176872
		JP	49014575
		US	3929953
		CH	551265
		GB	1378945
		NL	7303780
		ZA	7301907
		DE	2313501
		IT	984423
		US	3859028
AU	36429/71	CA	995433
		GB	1367338
		ZA	7108086
		DE	2159886
		IT	943162
		FR	2116487
		NL	7116626

END OF ANNEX